REMARKS

This is a full and timely response to the final Office Action (Paper No. 7) mailed by the U.S. Patent and Trademark Office on June 5, 2001. Claims 1-14 remain pending in the present application. Independent claims 1 and 10 have been amended. In view of the foregoing amendments and following remarks, reconsideration and allowance of the present application and claims are respectfully requested.

Rejections Under 35 U.S.C. §102

Claims 1-14 stand rejected under 35 U.S.C. §102(e) as allegedly being anticipated by U.S. Patent No. 5,920,080 to Jones. A proper rejection of a claim under 35 U.S.C. §102 requires that a single prior art reference disclose each element of the claim. *See, e.g., W.L. Gore & Assoc., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 U.S.P.Q. 303, 313 (Fed. Cir. 1983). Anticipation requires that each and every element of the claimed invention be disclosed in a single prior art reference. *See e.g., In re Paulsen,* 30 F.3d 1475, 31 USPQ2d 1671 (Fed. Cir. 1994); *In re Spada,* 911 F.2d 705, 15 USPQ2d 1655 (Fed. Cir. 1990). Alternatively, anticipation requires that each and every element of the claimed invention be embodied in a single prior art device or practice. *See, e.g., Minnesota Min. & Mfg. Co. v. Johnson & Johnson Orthopaedics, Inc.*, 976 F.2d 1559, 24 USPQ2d 1321 (Fed. Cir. 1992). The test is the same for a process. Anticipation requires identity of the claimed process and a process of the prior art. The claimed process, including each step thereof, must have been described or embodied, either expressly or inherently, in a single reference. *See, e.g., Glaverbel S.A. v. Northlake Mkt'g & Supp., Inc.*, 45 F.3d 1550, 33 USPQ2d 1496 (Fed. Cir. 1995). Those elements must either be inherent or disclosed expressly. *See, e.g., Constant v. Advanced Micro-Devices, Inc.*, 848 F.2d 1560, 7 USPQ2d 1057 (Fed. Cir. 1988); *Verdegaal Bros.,*

Inc. v. Union Oil Co., 814 F.2d 628, 2 USPQ2d 1051 (Fed. Cir. 1987). Those elements must also be arranged as in the claim. *See, e.g., Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 9 USPQ2d 1913 (Fed. Cir. 1989); *Carella v. Starlight Archery & Pro Line Co.*, 804 F.2d 135, 231 USPQ 644 (Fed. Cir. 1986). For anticipation, there must be no difference between the claimed invention and the reference disclosure, as viewed by a person of ordinary skill in the field of the invention. *See, e.g., Scripps Clinic & Res. Found. v. Genentech, Inc.*, 927 F.2d 1565, 18 USPQ2d 1001 (Fed. Cir. 1991).

Accordingly, the single prior art reference must properly disclose, teach or suggest each element of the claimed invention.

It is alleged in the Office Action that:

> Regarding claim 1, Jones discloses an organic light emitting device (10 of Fig 4) comprising an electrode (251, 202 of Fig 3, lines 14-15 of column 9, lines 39-41 of column 8) a current self-limiting structure (253 and 203 of Fig 4, lines 43-44 of column 8, and 19-20 of column 9), and an organic stack (300 of Fig 5, lines 10-12 of column 9) between the electrode (251) and the current limiting structure (203, See Fig 4). Though Jones does not explicitely disclose that the layers 253 and 203 are current self-limiting structure, it is inherent since layers are made current self-limiting material
>
> Regarding claim 2, Jones discloses that the current self-limiting structure (253 and 203 of Fig 4) resides in contact with the electrode (251 of Fig 3).
>
> Regarding claim 3, Jones discloses that the current self-limiting structure (253 and 203 of Fig 4) applied as a patterned lattice structure over the electrode (lines 21-22 of column 7, see Fig 8).
>
> Regarding claim 4, Jones discloses that the current self-limiting structure (203) is applied as a grid defining windows in which the electrode (202 of Fig 4) is applied.
>
> Regarding claim 5, though Jones does not specifically mention that the current self-limiting structure (253 and 203 of Fig 4) comprises an anisotropically conductive material, it is inherent since Jones used barium titanate as the current limiting component which is an anisotropically conductive material (see US 5414403).
>
> Regarding claim 6, Jones discloses a photoresist material in contact with the electrode (202 of fig 4) and the current self-limiting structure (203 of Fig 4, see lines 51-54 of column 8).

It is further alleged in the Office Action that:

> Regarding claim 7, Jones discloses that the current self-limiting structure (203 of Fig 4) resides between the electrode (202 of Fig 4) and a conducting layer (not shown in Fig, see lines 56-59 of column 8).
>
> Regarding claim 8 Jones discloses that the conducting layer is embedded within the current self-limiting structure (203 of Fig 4, see lines 56-59 of column 8).
>
> Regarding claim 9, Jones discloses that the conducting layer resides over the current self-limiting structure (lines 56059 of column 8).
>
> Claim 10 recites essentially the same limitation of claim 1. Thus claim 10 is rejected as claim 1 (see rejection of claim 1). In this case, Jones does not explicitty specify that the organic light emitting has increased the reliability. But it is inherent since Jones uses current self-limiting component in the device.
>
> Claim 11 recites essentially the same limitation of claim 2. Thus claim 11 is rejected as claim 2 (see rejection of claim 2).
>
> Claim 12 recites essentially the same limitation of claim 3. Thus claim 12 is rejected as claim 3 (see rejection of claim 3).
>
> Claim 13 recites essentially the same limitation of claim 4. thus claim 13 is rejected as claim 4 (see rejection of claim 4).
>
> Claim 14 recites essentially the same limitation of claim 5. Thus claim 14 is rejected as claim 5 (see rejection of claim 3).

In response to Applicant's arguments filed on March 26, 2001, the Office Action states that:

> In response to applicant's argument that the dielectric layer 203 of Jones' organic light emitting device is not described anywhere as "a current self-limiting structure", it is the examiner's position that if the prior art layer has same structure as the claimed layer, both will have same characteristics and same function, because form follows function.
>
> Examiner respectfully points out that Jones teaches that the dielectric layer 203 is made of barium titanate (lines 43-44 of column 8).
>
> Applicant admits that barium titanate is a current self-limiting material (see lines 4-6 of page 6 of the specification). Consequently, barium titanate layer 203 and 253 (being of same material) in Jones' device is a current self-limiting structure.
>
> Thus Jones indeed discloses a current self-limiting structure as applicant's claimed invention.

Applicants respectfully submit that *Jones* appears to disclose that the transition layers 203 and 253 are constructed using barium titanate, and specifically in col. 9, lines 16-18, that "[t]he transition layer 253 is preferentially formed from either LiF or barium and has a thickness of approximately 10 nms." Applicants respectfully submit that a 10nms thick transition layer 203 that is capable of injecting holes or electrons, as disclosed in *Jones* in col. 8, lines 42-43, is incapable of acting as a current self-limiting layer because it is too thin to provide such a characteristic. Furthermore, while Applicants indeed mention in the specification of the instant application that barium titanate is a current self-limiting material, Applicants also state on page 8, lines 23-24 that the "CSL layer 105 can be applied in a thickness sufficient to prevent excess current in the vicinity of a short." Applicants respectfully submit that it cannot be inherent for the transition layers 203 and 253 of *Jones* to function as current self-limiting materials because the thickness limitation (preferentially 10 nms) placed on the transition layers 203 and 253 by *Jones* would prevent such functionality.

However, to advance prosecution of the application, Applicants have amended independent claim 1 to recite the feature of "an organic stack located between said electrode and said current self-limiting structure, where said current self-limiting structure is applied in a thickness sufficient to prevent excessive current in the vicinity of a short in said organic light emitting device" and have amended independent claim 10 to recite the step of "incorporating a current self-limiting structure within said organic light emitting device, said current self-limiting structure applied in a thickness sufficient to prevent excessive current in the vicinity of a short in said organic light emitting device." Applicants respectfully submit that support for this feature can be found in the specification on page 8, lines 22-24 where it is stated that "CSL layer 105 can be applied in a thickness sufficient to prevent excess current in the vicinity of a short."

Applicant respectfully submits that this feature of the current self-limiting structure being applied in a thickness sufficient to prevent excessive current in the vicinity of a short in an organic light emitting device is neither disclosed, taught nor suggested by *Jones*.

Further, as mentioned in the previous response dated March 20, 2001, *Jones* mentions in the Background of the Invention section that "[e]dge shorting between the cathode and anode layers is another problem affecting most conventional OLED devices. Edge shorting reduces the illumination potential of the display. Edge shorting is the channeling of light within the organic layers. As a result of the channeling, light is not directed towards the viewer." However, nowhere does *Jones* disclose, teach or suggest that it would be desirable to have a structure between a conductor and the organic stack that limits the flow of current in the vicinity of an electrical short. Indeed, other than a brief mention of edge shorting in the Background of the Invention section and a brief mention of restricting light emission in directions parallel to the planar substrate in the Summary of the Invention section, nowhere does *Jones* disclose, teach or suggest the desirability, much less any structure or method, of limiting the flow of current in the vicinity of a short in an OLED device.

The Office Action states that *Jones* discloses "a current self-limiting structure (253 and 203 of Fig 4, lines 43-44 of column 8, and 19-20 of column 9)." Applicants respectfully submit that column 8, lines 43-44 of *Jones* merely discloses that a "sloped conductor pad 202 is surrounded by a transition layer 203 capable of injecting holes or electrons. The transition layer 203 may comprise barium titanate or other high dielectric constant materials." Applicants respectfully submit that nowhere is the transition layer 203 described as a current self-limiting structure. Indeed, *Jones* teaches that the transition layer 203 should be capable of injecting holes or electrons, thereby improving current flow, not limiting it. Furthermore, the 10nms thickness limitation placed on the

transition layers 203 and 253 by *Jones* is further evidence that Jones never intended such layers to function as current self-limiting layers.

With respect to claim 2, Applicants respectfully disagree with the statement in the Office Action that "Jones discloses that the current self-limiting structure (253 of Fig 3) resides in contact with the electrode (251 of Fig 3)." As mentioned above, Applicants respectfully submit that, because *Jones* fails to disclose, teach or suggest a current self-limiting structure, it is impossible for *Jones* to disclose a current self-limiting structure residing in contact with an electrode.

With respect to claim 3, Applicants respectfully disagree with the statement in the Office Action that "Jones discloses that the current self-limiting structure (253 and 203 of Fig 4) applied as a patterned lattice structure over the electrode (lines 21-22 of column 7, see Fig 8)." Applicants submit that column 7 lines 21-22 merely disclose that "[t]he substrate 100 may underlie a plurality of different subpixels or cells 10." Furthermore, Applicants respectfully submit that with respect to FIG. 8. *Jones* merely teaches that the planar substrate 100 may include a matrix 800. The matrix 800 includes matrix lines 801 or 802 which are capable of carrying current or voltage pulses of selected magnitude. See column 8, lines 37-41). It appears that the configuration shown in FIG. 8 of *Jones* is merely a way of distributing current and voltage to the cells 10, and fails to disclose, teach or suggest applying a current self-limiting structure over an electrode in the form of a patterned lattice structure as recited in claim 3.

Similarly, with respect to claim 4, nowhere does *Jones* disclose, teach or suggest applying the current self-limiting structure as a grid defining windows in which an electrode is applied.

With respect to claim 5, Applicants respectfully disagree with the statement in the Office Action that "though Jones does not specifically mention that the current self-

limiting structure (253 and 203 of Fig. 4) comprises an anisotropically conductive material, it is inherent since Jones used barium titanate as the current limiting component which is an anisotropically conductive material (see US 5414403)." Applicants respectfully submit that *Jones* fails to disclose, teach or suggest that the transition layers 203 and 253 are a current self-limiting structure, and instead discloses merely that the transition layers are high dielectric constant materials.

With respect to claim 6, Applicants respectfully submit that *Jones*, in column 8, lines 51-54 appears to disclose that the slope of the pad 202 (the conductor pad 202 that is surrounded by the transition layer 203) is achieved by undercutting the edges. The undercutting is achieved through resist or bilayer loss. Applicants respectfully submit that nowhere does *Jones* disclose, teach or suggest a photoresist material in contact with a current self-limiting structure and an electrode.

With respect to claim 7, Applicants respectfully disagree with the statement in the Office Action that "Jones discloses that the current self-limiting structure (203 of Fig 4) resides between the electrode (202 of Fig 4) and a conducting layer (not shown in Fig, see lines 56-59 of column 8)." As mentioned above, Applicants respectfully submit that, because *Jones* fails to disclose, teach or suggest a current self-limiting structure, it is impossible for *Jones* to disclose a current self-limiting structure between an electrode and a conducting layer.

With respect to claims 8 and 9, Applicants respectfully submit that *Jones* fails to disclose, teach or suggest a current self-limiting structure.

With respect to claims 11 and 14, Applicants respectfully submit that *Jones* fails to disclose, teach or suggest the current self-limiting structure.

Accordingly, Applicants respectfully submit that amended independent claims 1 and 10 are allowable in that they recite features and steps that are neither disclosed, taught

nor suggested by *Jones*. Furthermore, Applicants respectfully submit that dependent claims 2-9 and 11-14 are allowable for at least the reason that they depend either directly or indirectly from allowable independent claims. *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988).

CONCLUSION

For at least the foregoing reasons, Applicants respectfully request that all outstanding rejections be withdrawn and that all pending claims of this application be allowed to issue. If the Examiner has any comments regarding Applicants' response or intends to dispose of this matter in a manner other than a notice of allowance, Applicants request that the Examiner telephone Applicants' undersigned attorney.

Respectfully submitted,

THOMAS, KAYDEN, HORSTEMEYER & RISLEY, L.L.P.

By: _____
Michael J. Tempel
Registration No. 41,344

Suite 1750
100 Galleria Parkway
Atlanta, Georgia 30339
(770) 933-9500

ANNOTATED VERSION OF MODIFIED CLAIMS TO SHOW CHANGES MADE

In accordance with 37 C.F.R. § 1.121, please find below the amended claims in which the inserted language is underlined ("__") and the deleted language is enclosed in brackets ("[ ]"):

1. (Once Amended) An organic light emitting device, comprising:

an electrode;

a current self-limiting structure; and

an organic stack located between said electrode and said current self-limiting

structure, where said current self-limiting structure is applied in a thickness sufficient to prevent excessive current in the vicinity of a short in said organic light emitting device.

10. (Once Amended) A method for increasing the reliability of an organic light emitting device, comprising the steps of:

forming an organic light emitting device; and

incorporating a current self-limiting structure within said organic light emitting device, said current self-limiting structure applied in a thickness sufficient to prevent excessive current in the vicinity of a short in said organic light emitting device.